

WHAT IS CLAIMED IS:

1. A steering control apparatus for an automotive vehicle, comprising:

5 a camera photographing a travel path in a traveling direction of a vehicle;

a lateral displacement calculating circuit that calculates a lateral displacement of the vehicle with respect to the travel path according to an image of
10 the travel path photographed by the camera;

a differentiator that calculates a differential value of the lateral displacement;

a vehicle speed sensor that detects a vehicle speed;

15 a relative yaw rate calculating section that calculates a relative yaw rate with respect to the travel path of the vehicle on the basis of the lateral displacement, the differential value of the lateral displacement, and the vehicle speed;

20 an actuator that provides an assistance force for the steering mechanism; and

an actuator controlling section that drivingly controls the actuator in a direction toward which the relative yaw rate is cancelled on the basis of the
25 relative yaw rate.

2. A steering control apparatus for an automotive vehicle as claimed in claim 1, wherein the lateral displacement calculating circuit comprises: a white
30 line recognition circuit that recognizes white lines located on both ends of the traveling path; a center position calculating circuit which calculates a center position between both ends of the travel path; and a deviation quantity calculating circuit that

calculates a lateral displacement of the vehicle with respect to the center position of the travel path.

3. A steering control apparatus for an automotive
5 vehicle as claimed in claim 2, wherein the white line
recognition circuit recognizes the white lines a
predetermined distance ahead of the vehicle and the
deviation quantity calculating section calculates a
variation rate of a relative angle between the center
10 position of the white line and the vehicle.

4. A steering control apparatus for an automotive
vehicle as claimed in claim 1, wherein the steering
control apparatus further comprises a steering torque
15 sensor that detects a steering torque applied to the
steering mechanism and the actuator controlling
section drivingly controls the actuator on the basis
of the relative yaw rate and the steering torque.

20 5. A steering control apparatus for an automotive
vehicle as claimed in claim 1, wherein the
differentiator comprises a filter processing
circuit.

25 6. A steering control apparatus for an
automotive vehicle as claimed in claim 1, wherein
the actuator controlling section outputs a
steering torque command value to the actuator,
the steering torque command value being a sum of
30 a steering assistance quantity calculated on the
basis of a steering torque and the vehicle speed
and a stability direction steering quantity

calculated on the basis of the calculated relative yaw rate.

7. A steering control apparatus for an
5 automotive vehicle as claimed in claim 6, wherein the actuator controlling section comprises a relative yaw rate controlling section comprising: a differentiator that differentiates the lateral displacement; a pseudo differentiation filter
10 constituted by a predetermined forward distance (L) and the vehicle speed; and a control gain section that provides a control gain in the direction toward which the relative yaw rate extracted from the pseudo differentiation filter
15 is cancelled and outputs the stability direction steering quantity.

8. A steering control apparatus for an
automotive vehicle as claimed in claim 7, wherein
20 the actuator controlling section comprises a steering assistance controlling section that calculates the steering assistance quantity on the basis of a steering torque and the vehicle speed.

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9. A steering control apparatus for an
automotive vehicle as claimed in claim 8, wherein
the actuator comprises an electrically driven
motor of a power steering mechanism of the
30 vehicle.

10. A steering control method for an automotive vehicle, comprising:

photographing a travel path in a traveling direction of a vehicle using a camera;

calculating a lateral displacement of the vehicle with respect to the travel path according to
5 an image of the travel path photographed by the camera;

calculating a differential value of the lateral displacement;

detecting a vehicle speed;

10 calculating a relative yaw rate with respect to the travel path of the vehicle on the basis of the lateral displacement, the differential value of the lateral displacement, and the vehicle speed;

providing a steering assistance force for the
15 steering mechanism using an actuator; and

drivingly controlling the actuator in a direction toward which the relative yaw rate is cancelled on the basis of the relative yaw rate.

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